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ASSIGNMENT BOOKLET

SCN2231 Biology 20

Module 7 Assignment

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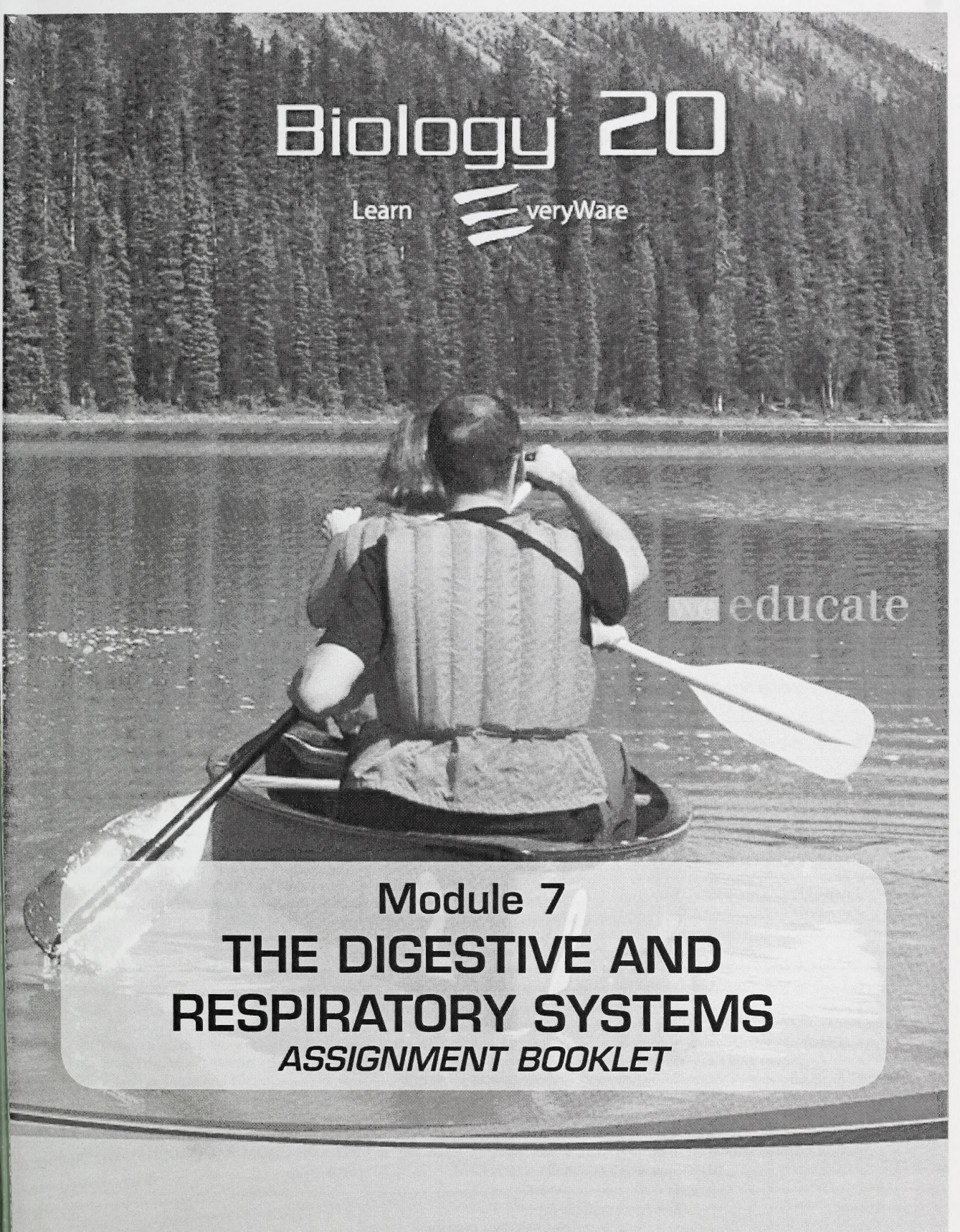
Biology 20

Learn



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Module 7

THE DIGESTIVE AND RESPIRATORY SYSTEMS

ASSIGNMENT BOOKLET

FOR TEACHER'S USE ONLY

Summary

Teacher's Comments

	Total Possible Marks	Your Mark
Lesson 1 Assignment	34	
Lesson 2 Assignment	20	
Lesson 3 Assignment	27	
Lesson 4 Assignment	39	

Biology 20
Module 7: The Digestive and Respiratory Systems
Assignment Booklet
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Teachers ☒

Administrators ☐

Home Instructors ☐

General Public ☐

Other ☐



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- Alberta Education, <http://www.education.gov.ab.ca>
- Learning Resources Centre, <http://www.lrc.education.gov.ab.ca>
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MODULE 7: LESSON 1 ASSIGNMENT

This Module 7: Lesson 1 Assignment is worth 34 marks. The value of each assignment and each question is stated in the left margin.

(34 marks) Lesson 1 Assignment: Molecules of Living Systems

Lab: Enzyme-Controlled Reactions

(5 marks) Data Table

Place your data in the space below.

(8 marks) Graphs

The information gathered in the data table can be represented in two ways. Refer to the objectives of this assignment to help you decide what two graphs you should include.

Journal Questions

- (4 marks) 1. Describe the relationship between substrate concentration and the initial reaction rate of an enzyme-catalyzed reaction. Is this a linear relationship? What happens to the initial reaction rate as substrate concentration increases?
- (1 mark) 2. What is the maximum initial reaction rate for this enzyme at pH 7?

- (2 marks) 3. Explain why the maximum initial reaction rate cannot be reached at low substrate concentrations.
- (2 marks) 4. What does your data indicate about the optimum pH level for this enzyme-catalyzed reaction?
- (3 marks) 5. Enzymes function most efficiently at the temperature of a typical cell, which is 37° Celsius. Increases or decreases in temperature can significantly lower the reaction rate. What does this suggest about the importance of temperature-regulating mechanisms in organisms? Explain.

TR 1. Hydrogen Peroxide and Catalase

- (1 mark) 1. At the end of the reaction, what did the bubbles and remaining solution in the test tube (or glass container) correspond to?
- (1 mark) 2. What was the source(s) of catalase enzyme in the reaction?
- (1 mark) 3. What substrate did the catalase enzyme act on?

- (2 marks) 4. What would have occurred if the H_2O_2 had been added to sterilized sand? Why?
- (2 marks) 5. What would most likely have happened if the H_2O_2 had been added to some soil from your backyard or from a local garden? Why?
- (2 marks) 6. What did you feel when you held the bottom of the test tube as the reaction proceeded? Why?

MODULE 7: LESSON 2 ASSIGNMENT

This Module 7: Lesson 2 Assignment is worth 20 marks. The value of each assignment and each question is stated in the left margin.

(20 marks) Lesson 2 Assignment: The Digestive System

Try This: The Journey from Gums to Bums

You will be returning to this activity throughout the lesson. Your end product will be a detailed representation of the digestive route from gums to bums.

TR 1. Mapping the Route from Gums to Bums

Begin creating a flow chart or diagram that states the first two structures involved in digestion—the mouth and esophagus—the function of the structures, as well as the secretions and functions of the secretions.

TR 2. Enroute from Gums to Bums

Add the stomach, its functions, its secretions, and the function of its secretions to your flow chart or diagram.

TR 3. Enroute from Gums to Bums: The Small Intestine and Accessory Organs

Add the small intestine, its functions, its secretions, and the function of its secretions to your flow chart or diagram. Don't forget to also include the pancreas, liver, duodenum, and gall bladder.

TR 4. Enroute from Gums to Bums: The Large Intestine

Add the large intestine and its function to your flow chart or diagram.

You will be graded by the following rubric. (Your rubric score will be multiplied by 5.)

Score	Scoring Criteria The flowchart or diagram...
4	- clearly shows the order of digestion by indicating the structures of the digestive system in sequence - clearly provides detailed functions of each organ - describes, in detail, the secretions of each organ and how each secretion works to aid in the digestion of carbohydrates, lipids, or proteins - indicates a negative feedback system - indicates matter and energy exchange at all possible locations
3	- shows the order of digestion by indicating the structures of digestion in sequence - provides a list of functions of each organ - describes the secretions of each organ and indicates if the secretion aids in digestion of carbohydrates, lipids, or proteins - indicates a negative feedback system - indicates matter and energy exchange
2	- indicates the structures of digestion - partially describes the function of the organs - lists secretions but may not provide a description of how each secretion works - partially describes a negative feedback system - partially indicates matter and energy exchange
1	addresses only one of the four scoring bullets at a 2 or 3 level
INS	does not contain a discernible attempt to address the activity in the assignment or is too brief to assess

MODULE 7: LESSON 3 ASSIGNMENT

This Module 7: Lesson 3 Assignment is worth 27 marks. The value of each assignment and each question is stated in the left margin.

(27 marks) Lesson 3 Assignment: The Respiratory System

TR 2. The Mechanics of Breathing

The diaphragm and the rib muscles (internal and external intercostals) control the air pressure inside the lungs that causes air to move in and out of the lungs.

1. Create a flow chart to illustrate the processes of

(6 marks) a. inhalation

(4 marks) b. exhalation

2. You may have to do some research outside of your textbook to answer these questions about collapsing lungs.

(1 mark)

- a. What is the medical term for lungs “collapsing”?

(2 marks)

- b. What causes this condition?

(2 marks)

- c. Why would physicians insert a tube into the chest to “re-inflate” the lung?

TR 3. Complete Investigation 7.A OR Interpreting a Spirograph

You will complete **either** Investigation 7.A: Measuring Respiratory Volumes **or** Interpreting a Spirograph. Do not complete both assignments. **Note:** You will need a spirometer to complete Investigation 7.A.

Investigation 7.A: Measuring Respiratory Volumes

Background Information

The amount of air a person’s lungs can hold depends on the size of the person. A spirometer is an instrument used to measure the breathing capacity of the lungs. Various quantities of air can be determined with this instrument. The amount of air taken in (inspiration) or breathed out (expiration) during normal breathing is called tidal air. Expiratory reserve volume is the air that can be forced out of the lungs after normal expiration. The amount of air that the lungs can bring in during forced inspiration is called inspiratory reserve volume. Vital capacity is the volume of air exhaled during forced breathing—it is the sum of tidal, expiratory reserve, and inspiratory reserve volume. The lungs are never completely empty of air.

After forced expiration, there may still be one litre of air left in the lungs. This is called residual air. Your vital capacity increases as you get older until about age 25. After this age, your vital capacity gradually decreases.

Data Table

Go to "Investigation 7.A: Measuring Respiratory Volumes" on page 251 of the textbook. Complete the "Procedure." Record your data in the following table, and then answer the following questions. If there is more than one person in your group, add an appropriate number of columns.

Name	
Tidal Volume	
Expiratory Reserve Volume	
Inspiratory Reserve Volume	
Total Vital Capacity	

Analysis

(1 mark) 1. Answer question 1 of "Analysis" on page 251 of the textbook.

(1 mark) 2. Answer question 2 of "Analysis" on page 251 of the textbook.

Conclusions

(2 marks) 3. Answer question 3 of "Conclusion" on page 251 of the textbook.

(4 marks) 4. Answer question 4 of "Conclusion" on page 251 of the textbook.

Extension

5. Vital capacity is a useful measure of lung function that is used for diagnosis of respiratory disease and as a measure of fitness. Vital capacity is measured by inhaling as much air as possible and then exhaling forcibly into a respirometer, taking the reading off a dial. Compared to the average value obtained for a large population of normal males, predict whether the following individuals will have a higher or lower vital capacity. Support your predictions with explanations. A list of the individuals follows.

(1 mark) a. a six-year-old girl

(1 mark) b. an adult male marathon runner

- (1 mark) c. an adult male 35 years of age who has been smoking a package of cigarettes per day for 20 years

- (1 mark) d. an adult male 70 years of age who has emphysema

Interpreting a Spirograph

A spirograph represents the amount of air that moves into and out of the lungs with each breath.

- (1 mark) 1. Complete the following chart:

Term	Definition
	<i>volume of air that is inhaled and exhaled in a normal breath</i>
inspiratory reserve volume	<i>additional volume of air that can be taken into lungs beyond tidal inhalation</i>
expiratory reserve volume	<i>additional volume of air that can be forced out of the lungs beyond tidal inhalation</i>
	<i>total volume of gas that can be taken into and forced out of the lungs It is calculated by adding the tidal volume + inspiratory reserve volume + expiratory reserve volume.</i>
residual volume	<i>amount of gas that remains in the lungs and respiratory system passageways even after full exhalation; is necessary so lungs do not collapse</i>

Study the spirograph ("Figure 7.6") on page 251 of the textbook, and answer the following questions.

- (1 mark) 2. What is the typical tidal volume (in mL) for humans?

(1 mark) 3. What is the typical expiratory reserve volume (in mL) for humans?

(1 mark) 4. What is the typical vital capacity (in mL) for humans?

(4 marks) 5. Answer question 4 of "Conclusion" on page 251 of the textbook.

6. Vital capacity is a useful measure of lung function that is used for diagnosis of respiratory disease and as a measure of fitness. Vital capacity is measured by inhaling as much air as possible and then exhaling forcibly into a respirometer, taking the reading off a dial. Compared to the average value obtained for a large population of normal males, predict whether the following individuals will have a higher or lower vital capacity. Support your predictions with explanations. A list of the individuals follows.

(1 mark) a. a six-year-old girl

(1 mark) b. an adult male marathon runner

(1 mark)

- c. an adult male 35 years of age who has been smoking a package of cigarettes per day for 20 years

(1 mark)

- d. an adult male 70 years of age who has emphysema

MODULE 7: LESSON 4 ASSIGNMENT

This Module 7: Lesson 4 Assignment is worth 39 marks. The value of each assignment and each question is stated in the left margin.

(39 marks) Lesson 4 Assignment: Science, Technology, and Society

(12 marks) TR 1. Health and the Digestive System: Traditional vs. Western Practices

Choose one of the digestive disorders mentioned in your textbook or one that you may be familiar with from your research or personal knowledge. How would a First Nations healer approach dealing with the disorder compared to a doctor practising Western medicine?

You may have to do research in order to present a complete response.

You may present your response in writing on a separate piece of paper, through a visual (e.g., a pamphlet or a poster), by podcast, or via any other method you would like to use. You will be marked according to the following rubric.

Score	Scoring Criteria The student...
4	- identifies the disorder and clearly describes in detail how the disorder affects homeostasis in relation to enzyme action - clearly compares and describes methods of diagnosis and treatment between Western and traditional medicine - clearly shows evidence of research in the quality of detail presented
3	- identifies the disorder and describes how the disorder affects homeostasis in relation to enzyme action - compares methods of diagnosis and treatment between Western and traditional medicine - shows evidence of research in the quality of detail presented
2	- partially describes how the disorder affects homeostasis - partial comparison is made between traditional medicine and Western medicine practices - may or may not show evidence of research
1	only addresses one of the scoring bullets at a 2 or 3 level
INS	does not present a discernable attempt to complete the activity

TR 2. You Diagnose It

Complete "Thought Lab 7.2" on page 261 of the textbook. In this activity you will look at the symptoms of two patients and determine what their disorders may be.

(10 marks) Chart

Your chart should include

- ten respiratory disorders
- symptoms
- causes
- effects on breathing
- technology used for diagnosis

Please put your chart in the area provided, or attach it to this document.

Analysis

- (6 marks) 1. Diagnose each patient based on your chart. Is there more than one possible disorder that the patients could be suffering from? Explain your answer.
- (3 marks) 2. Answer question 2 of “Analysis” on page 261 of the textbook.
- (8 marks) 3. Answer question 3 of “Analysis” on page 261 of the textbook.

Once you have completed all of the questions, submit your work to your teacher.

